

FIG. 1

DNA sequence for human
preproparathyroid hormone.

10 30 50
ATGATHCCNGCNAARGAYATGGCNAARGTNATGATHGTNATGYTNGCNATHGTGYTTYTNTN

70 90 110
ACNAARWSNGAYGGNAARWSNGTNAARAARMGNWSNGTNWSNGARATHCARYTNATGCAY

130 150 170
AAYYTNGGNAARCAYYTNAAYWSNATGGARMGNGTNGARTGGYTNGMNAARAARYTNCAR

190 210 230
GAYGTNCAYAAYYTTYGTNGCNYTNGGNGCHCCNYTNGCNCNMGNMGAYGCNNGNWSNCAR

250 270 290
MGNCCNMGNARAARGARGAYAAAYGTNYTNGTNGARWSNCAYGARAARWSNYTNGGNGAR

310 330
GCNGAYAARGCNGAYGTNAAYGTNYTNACNAARGCNAARWSNCARTRR

M = A or C
R = A or G
W = A or T
S = C or G
Y = C or T
H = A or C or T
N = A or G or C or T.

FIG. 2

DNA sequence for human
preproparathyroid hormone in plasmid pSSHPTH-10.

```
      10      30      50
ATGATGATACCTGCAAAAGACATGGCTAAAGTTATGATTGTCATGTTGGCAATTTGTTTT

      70      90     110
CTTACAAAATCGGATGGGAAATCTGTTAAGAAGAGATCTGTGAGTGAAATACAGCTTATG

     130     150     170
CATAACCTGGGAAAACATCTGAACTCGATGGAGAGAGTAGAATGGCTGCGTAAGAAGCTG

     190     210     230
CAGGATGTGCACAATTTTGTGCCCCTGGAGCTCCTCTAGCTCCCAGAGATGCTGGTTCC

     250     270     290
CAGAGGCCCCGAAAAAAGGAAGACAATGTCTTGTTGAGAGCCATGAAAAAAGTCTTGGA

     310     330
GAGGCAGACAAAGCTGATGTGAATGTATTAAGCTAAATCCCAGTGA
```

FIG. 3

Portion of DNA sequence of the plasmid
for insertion into *E. coli*, coding for human
preproparathyroid hormone with flanking sequences.

10 30 50
TATGATGATHCCNGCNAARGAYATGGCNAARGTNATGATHGTNATGYTNGCNATHGTGTT

70 90 110
YYTNACNAARWSNGAYGGNAARWSNGTNAARAARMGNWSNGTNWSNGARATHCARYTNAT

130 150 170
GCAYAAYYTNGGNAARCAYYTNAAYWSNATGGARMGNGTNGARTGGYTNGMNAARAARYT

190 210 230
NCARGAYGTNCAYAAYTTYGTNGCNYTNGGNGCNCNYTNGCNCNMGNNGAYGCNGGNWS

250 270 290
NCARMGNCCNMGNAARAARGARGAYAAYGTNYTNGTNGARWSNCAYGARAARWSNYTNGG

310 330 350
NGARGCNGAYAARGCNGAYGTNAAYGTNYTNACNAARGCNAARWSNCARTRRAAATGAAA

370 390 410
ACAGATATTGTCAGAGTTCTGCTCTAGACAGTGTAGGGCAACAATACATGCTGCTAATTC

430
AAAGCTCTATTA

M = A or C
R = A or G
W = A or T
S = C or T
Y = C or T
H = A or C or T
N = A or G or C or T.

FIG. 4

DNA sequence for human preproparathyroid hormone in plasmid pSSHPTH-10 with flanking sequences.

```
      10              30              50
TATGATGATACCTGCAAAAGACATGGCTAAAGTTATGATTGTCATGTTGGCAATTTGTTT

      70              90              110
TCTTACAAAATCGGATGGGAAATCTGTTAAGAAGAGATCTGTGAGTGAAATACAGCTTAT

      130             150             170
GCATAACCTGGGAAAACATCTGAACTCGATGGAGAGAGTAGAATGGCTGCGTAAGAAGCT

      190             210             230
GCAGGATGTGCACAATTTTGTGCCCCTGGAGCTCCTCTAGCTCCCAGAGATGCTGGTTC

      250             270             290
CCAGAGGCCCCGAAAAAAGGAAGACAATGTCTTGTTGAGAGCCATGAAAAAAGTCTTGG

      310             330             350
AGAGGCAGACAAAGCTGATGTGAATGTATTAAGCTAAATCCCAGTGAAAATGAAA

      370             390             410
ACAGATATTGTCAGAGTTCTGCTCTAGACAGTGTAGGGCAACAATACATGCTGCTAATTC

      430
AAAGCTCTATTA.
```

FIG. 5

DNA sequence coding for
preproparathyroid hormone in pSSHPTH-10 with flanking
sequences, showing the corresponding amino acid
sequence of preproparathyroid hormone.

```

      10              30              50
TATGATGATACCTGCAAAAGACATGGCTAAAGTTATGATTGTCATGTTGGCAATTTGTTT
  MetIleProAlaLysAspMetAlaLysValMetIleValMetLeuAlaIleCysPh

      70              90              110
TCTTACAAAATCGGATGGGAAATCTGTTAAGAAGAGATCTGTGAGTGAAATACAGCTTAT
eLeuThrLysSerAspGlyLysSerValLysLysArgSerValSerGluIleGlnLeuMe

      130              150              170
GCATAACCTGGGAAAACATCTGAACTCGATGGAGAGAGTAGAATGGCTGCGTAAGAAGCT
tHisAsnLeuGlyLysHisLeuAsnSerMetGluArgValGluTrpLeuArgLysLysLe

      190              210              230
GCAGGATGTGCACAATTTTGTGGCCCTTGGAGCTCCTCTAGCTCCCAGAGATGCTGGTTC
uGlnAspValHisAsnPheValAlaLeuGlyAlaProLeuAlaProArgAspAlaGlySe

      250              270              290
CCAGAGGCCCCGAAAAAAGGAAGACAATGTCTTGGTTGAGAGCCATGAAAAAGTCTTGG
rGlnArgProArgLysLysGluAspAsnValLeuValGluSerHisGluLysSerLeuGl

      310              330              350
AGAGGCAGACAAAGCTGATGTGAATGTATTAATAAGCTAAATCCCAGTGAAATGAAA
yGluAlaAspLysAlaAspValAsnValLeuThrLysAlaLysSerGlnEnd

      370              390              410
ACAGATATTGTCAGAGTTCTGCTCTAGACAGTGTAGGGCAACAATACATGCTGCTAATTC

      430
AAAGCTCTATTA.
```

Figure 6. Nucleotide sequence of the MF 1-HPTH fusion gene from pS LX5-HPTH1. Nucleotide nos. 1-173 makeup the MF 1 promoter region and 5' noncoding sequence. 174-440 is the MF 1 N-terminal coding sequence. 441-695 is the HPTH sequence obtained from pSSHPTH-10. 696-726 is an HPTH 3' noncoding sequence from pSSHPTH-10. 727-732 is from pUC19. 733-874 is MF 1 3' noncoding sequence and transcriptional termination signal.

```

10      10      30      50
AGTGCAAGAAAACCAAAAAGCAACAACAGGTTTTGGATAAGTACATATATAAGAGGGCCT

      70      90      110
TTTGTTCCTCATCAAAAATGTTACTGTTCTTACGATTCATTTACGATTCAAGAATAGTTCA

15      130      150      170
AACAGAAGATTACAACTATCAATTTTCATACACAATATAAACGACCAAAAGAATGAGAT

      190      210      230
TTCCTTCAATTTTTACTGCAGTTTTATTTCGCAGCATCCTCCGCATTAGCTGCTCCAGTCA

      250      270      290
ACACTACAACAGAAGATGAAACGGCACAAATTCCGGCTGAAGCTGTCATCGGTTACTCAG

20      310      330      350
ATTTAGAAGGGGATTTTCGATGTTGCTGTTTTGCCATTTTCCAACAGCACAAATAACGGGT

      370      390      410
TATTGTTTATAAATACTACTATTGCCAGCATTGCTGCTAAAGAAGAAGGGGTATCTTTGG

      430      450      470
25 ATAAAAGAGAGGCTGAAGCTTCTGTGAGTGAAATACAGCTTATGCATAACCTGGGAAAAC

      490      510      530
ATCTGAACTCGATGGAGAGAGTAGAATGGCTGCGTAAGAAGCTGCAGGATGTGCACAATT

      550      570      590
TTGTTGCCCTTGGAGCTCCTCTAGCTCCCAGAGATGCTGGTTCCCAGAGGCCCGAAAAA

      610      630      650
AGGAAGACAATGTCTTGGTTGAGAGCCATGAAAAAAGTCTTGGAGAGGCAGACAAAGCTG

      670      690      710
5 ATGTGAATGTATTAATACTAAAGCTAAATCCCAGTGAAAATGAAAACAGATATTGTCAGAGT

```

730 750 770 08/340664
TCTGCTCTA TCGACTTTGTTCCCACTGTACTTT TCGTACAAAATACAAATATAC

790 810 830
TTTTCAATTTCTCCGTAAACAACCTGTTTTCCCATGTAATATCCTTTTCTATTTTTCGTTT

10

850 870
CGTTACCAACTTTACACATACTTTATATAGCTAT

Fig. 7. Partial DNA sequence for the plasmid 08/340664
insertion into yeast in which: Nucleotide nos. 1-173
makeup the MF 1 promoter region and 5' noncoding
sequence. 174-440 is the MF 1 N-terminal coding
sequence. 441-695 is an HPTH sequence. 696-726 is an
HPTH 3' noncoding sequence from pSSHPTH-10. 727-732 is
from pUC19. 733-874 is MF 1 3' noncoding sequence and
transcriptional termination signal.

```
10          10                               30
50
AGTGCAAGAAAACCAAAAAGCAACAACAGGTTTTGGATAAGTACATATATAAGAGGGCCT
          70                               90                               110
TTTGTTCCCATCAAAAATGTTACTGTTCTTACGATTCATTTACGATTCAAGAATAGTTCA
15          130                               150                               170
AACAAGAAGATTACAAACTATCAATTTTCATACACAATATAAACGACCAAAAGAATGAGAT
          190                               210                               230
TTCCTTCAATTTTTACTGCAGTTTTATTTCGCAGCATCCTCCGCATTAGCTGCTCCAGTCA
          250                               270                               290
ACACTACAACAGAAGATGAAACGGCACAAATTCCGGCTGAAGCTGTCATCGGTTA^CTCAG
20          310                               330                               350
ATTTAGAAGGGGATTTTCGATGTTGCTGTTTTTGCCATTTTCCAACAGCACAAATAACGGGT
          370                               390                               410
TATTGTTTATAAATACTACTATTGCCAGCATTGCTGCTAAAGAAGAAGGGGTATCTTTGG
          430                               450                               470
25 ATAAAAGAGAGGCTGAAGCTWSNGTNWSNGARATHCARYTNATGCAYAAYYTNGGNAARC
          490                               510                               530
AYYTNAAYWSNATGGARMGNGTNGARTGGYT NMGNAARAARYTNCARGAYGTNCAYAAYT
          550                               570                               590
TYGTNGCNYTNGGNGCNCNCCNYTNGCNCNMGN GAYGCN GGNWSNCARMGNCNMGNAARA
          610                               630                               650
ARGARGAYAAYGTNYTNGTNGARWSNCAYGARAARWSNYTNGGNGARGCNGAYAARGCNG
          670                               690                               710
5 AYG TNAAYGTNYTNACNAARGCNAARWSNCARTRRAAATGAAAACAGATATTGTCAGAGT
```

730 750 770 08/340664
TCTGCTCTAGCGACTTTGTTCCCACTGTACTTTTCGTACAAAATACAATATAC

790 810 830
TTTTCATTTCTCCGTAAACAACCTGTTTTCCCATGTAATATCCTTTTCTATTTTTCGTTT

10

850 870
CGTTACCAACTTTACACATACTTTATATAGCTAT, wherein

15

M = A or C
R = A or G
W = A or T
S = C or G
Y = C or T
H = A or C or T
N = A or G or C or T

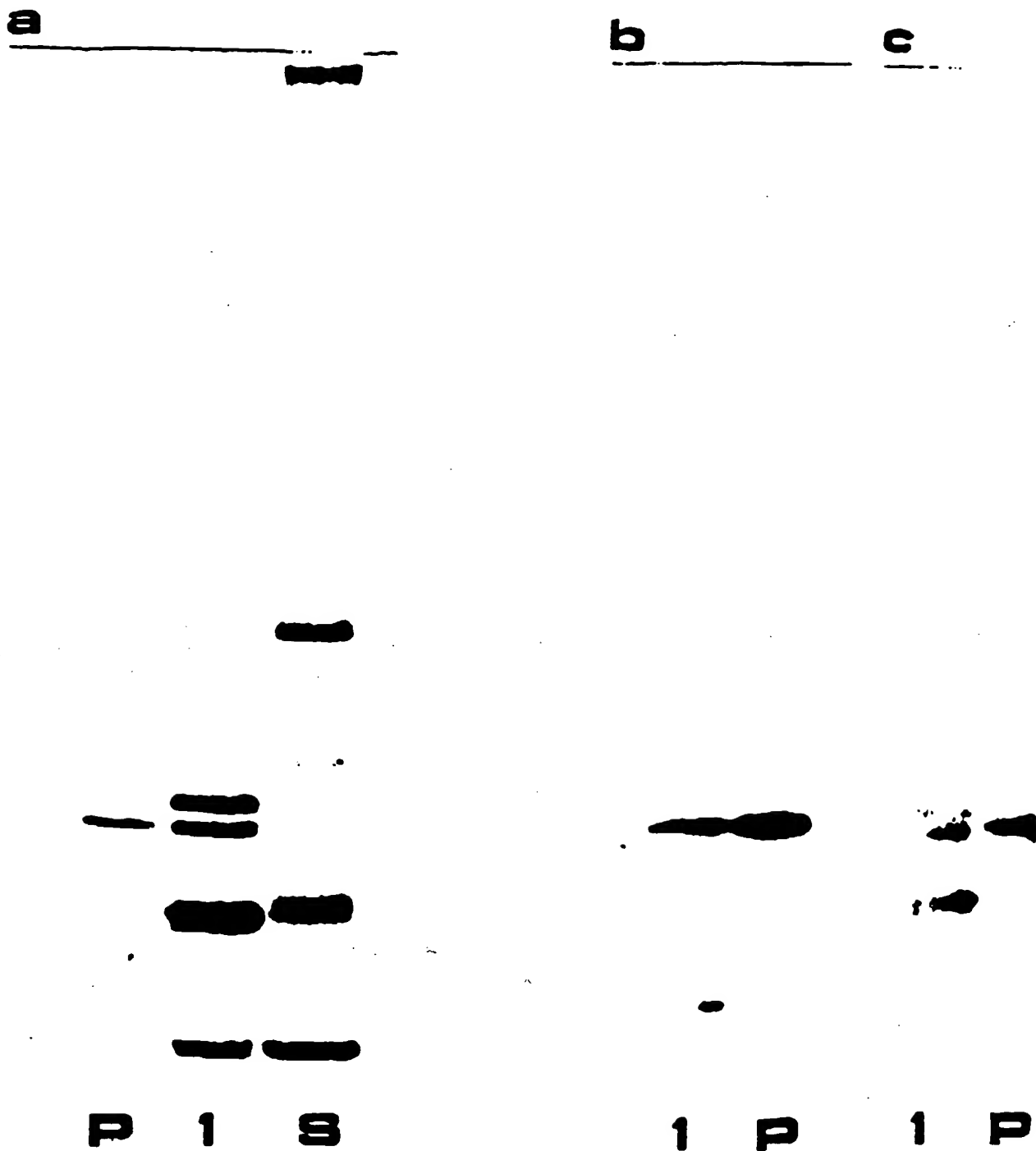
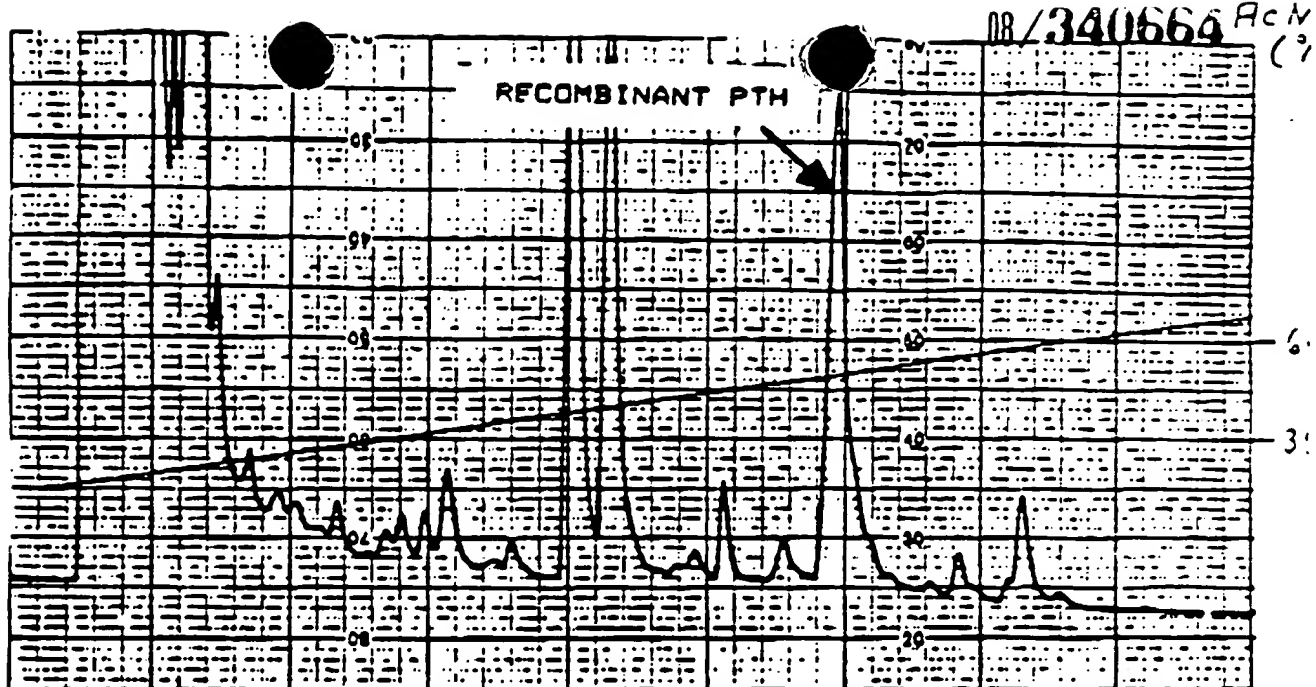


FIG. 8



B.

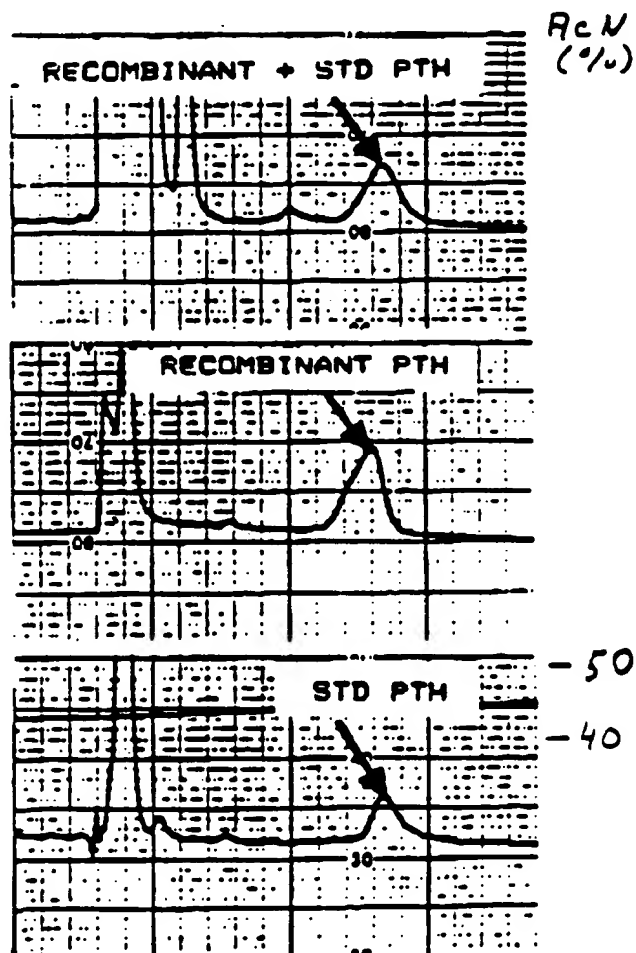


FIG. 9

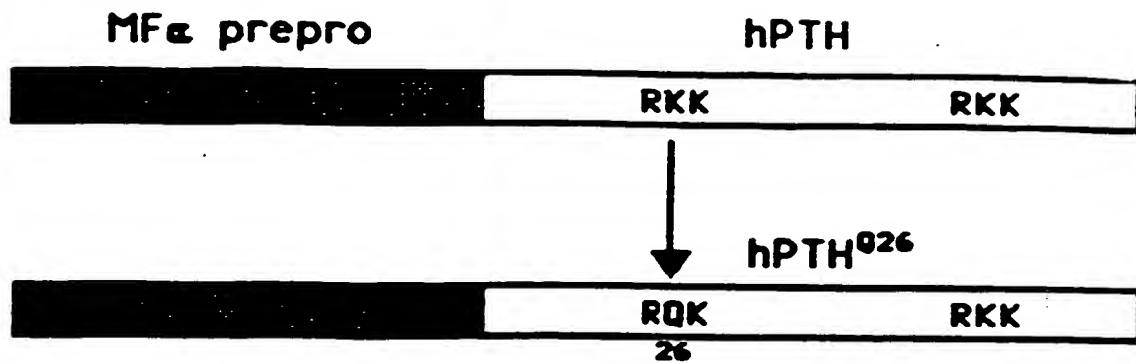


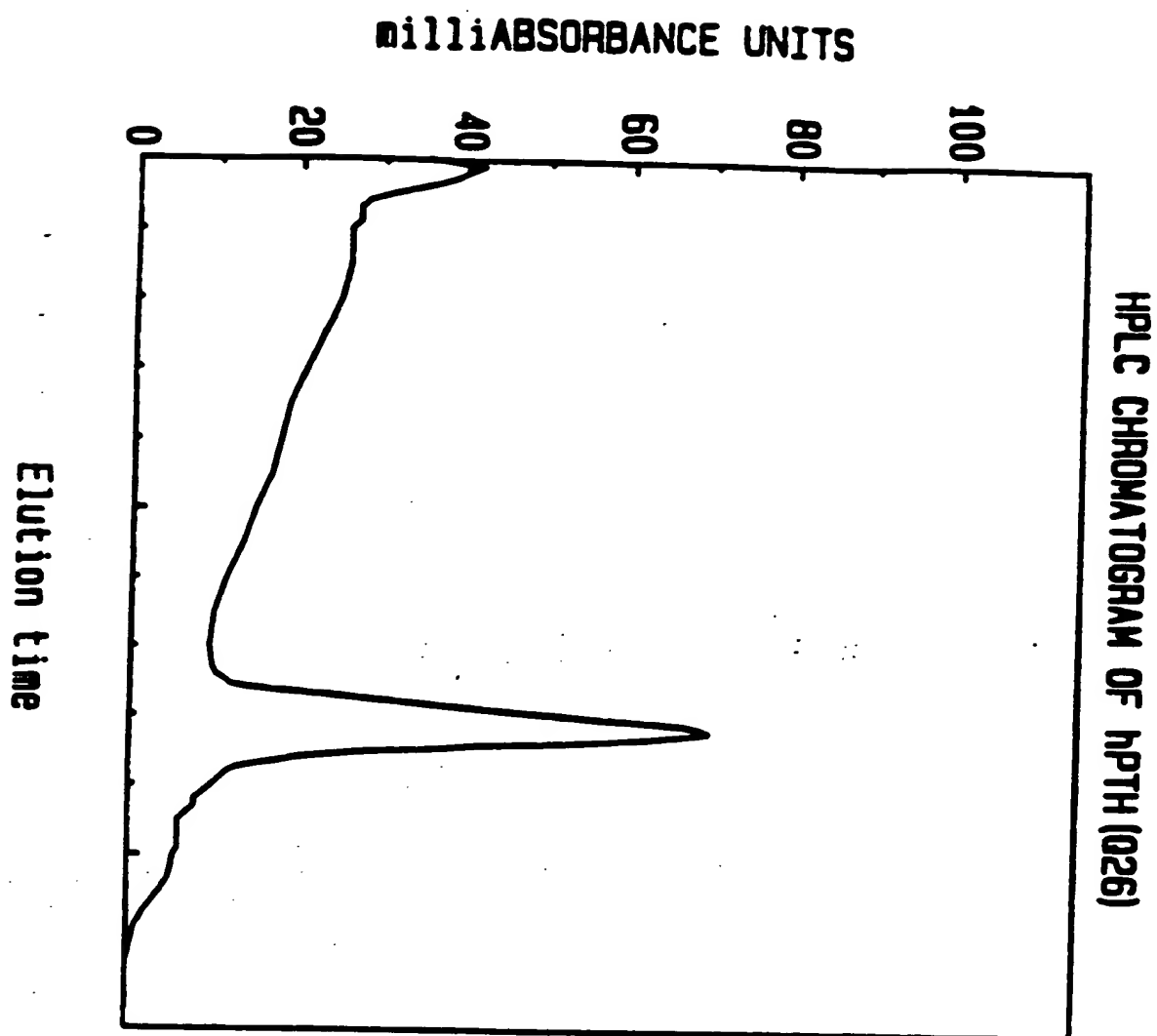
FIG. 11



1 2 M

FIG. 12

A



B



FIG. 13

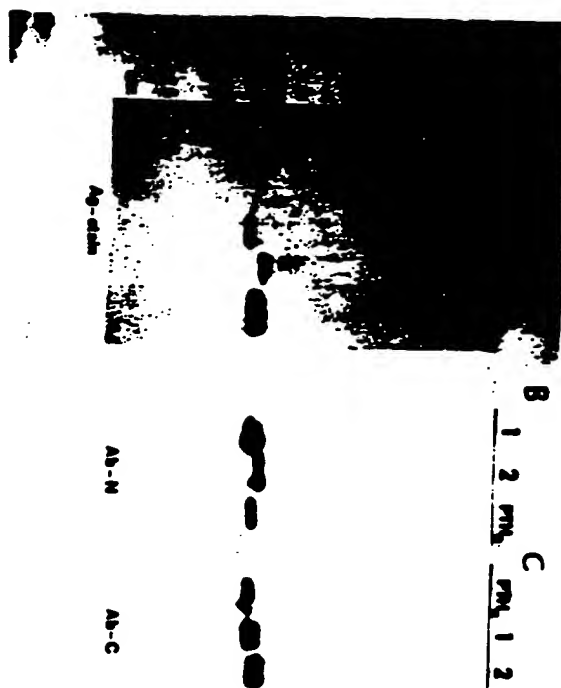


FIG. 14

FIG. 15

